REMARKS

Claims 1, 4, 7, 10, 11, 12, and 15 are pending in the present application. Before addressing the particulars of the claim rejections, Applicants note the following features of embodiments of their invention with respect to, for example, Figures 1b through Figure 4. Consider the prior art "second surface disk" illustrated in Figure 1a. As pointed out by the Applicants on page 11 and also in the background section of the application, the information layers in such conventional optical disks are covered by a relatively thick polycarbonate substrate or cover sheet. For example, such a cover sheet is included on CD-ROMs for personal computers. As stated by the Applicants on page 3, line 27, the "relatively thick and transparent substrate of second-surface optical disks makes read-only or read/write operations relatively insensitive to dust particles, scratches, and the like since they can be located approximately a thousand wavelengths or more from the information layer." This may be seen in Figure 1a, where the information layer formed by grooves 108 and lands 110 is covered by layer 102. This layer is optically quite thick so that imperfections on surface 104 are defocused with respect to the underlying information layer. Because of this defocusing effect, you can freely handle CD-ROMS, placing all manner of fingerprints and dust on their surface, yet they work quite readily. The present assignee of this application has developed "first surface" optical disks that have no such defocusing layer. This may be seen with respect to Figure 1b, where the laser beam impinges on the information layer 104 without passing through any defocusing/relatively thick substrate layer. In this inventive first surface disk, a ROM portion (element 202 in Figure 2) and a RAM portion 204 are formed by the covering of a stamped substrate with a continuous phase-change layer.

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It may immediately be seen that this is strikingly different from prior art disks. Typically, ROM disks such as a CD-ROM are covered with a reflective layer such as aluminum. This reflective layer covers features stamped into a substrate layer. Then another substrate layer overlays the reflective layer to form a second surface disk. In contrast, phase-change layers are used in the prior art to form writeable optical disks. Whereas the goal in a ROM disk where the features are read by reflection, writeability requires absorption, not reflective properties. Thus, prior art disks having ROM and RAM portions were clumsy affairs, needing lots of masking steps to form the reflective ROM portion vs. the absorbing RAM portion.

In sharp contrast, Applicants provide a first surface optical disks wherein a single phase change layer covers a stamped (in one embodiment) substrate. They were able to do so by choosing a phase change layer which had just the right amount of reflectivity and absorptivity so that it could form both ROM and RAM portions. Through this dramatic innovation, the manufacture became vastly cheaper and easier. At the same time, because no defocusing layer is used, optical aberrations and other distortions are removed, such that the feature size may be shrunk accordingly. To provide better optical coupling to the phase change layer, a sputtered dielectric layer may cover the phase change layer as described, for example, on page 16, line 29. Unlike a second surface disk, this optical coupling layer, being just sputtered on, is far too thin to provide a defocusing effect. Thus, although Applicants' disk cannot be handled like a CD-ROM (with no defocusing layer, the fingerprints would be problematic), it has none of the optical aberrations which plague conventional second surface disks. As seen in Figures 3 and 4, no additional layers cover the information layer. Thus, the features are not "filled in" as they would be in a second surface disk as seen in Figure 1a.

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As described by the Applicants starting on page 22, the ROM section is formed using bumps whereas the RAM section does not include these bumps. Applicants have discovered that by limiting the data density in the ROM section to be less than the density employed in the RAM section, data jitter and other error caused by the failure of substrate resin to completely fill the bumps is reduced. This inventive discovery is reflected in claim 1, which recites "bumps formed on a first portion of the first principal surface, wherein the bumps represent pre-recorded information; lands formed on a second portion of the first principal surface; and a phase-change material deposited on the first portion and the second portion of the first principal surface; and a dielectric layer sputtered over the phase-change material; the first surface disk having no additional layers overlaying the dielectric layer, wherein a data density of the first portion is less than a data density of the second portion."

In response to the above arguments, the Obata reference (USP 6,839,900) has been cited. Applicants agree that, at initial blush, Obata would appear to be teaching a ROM/RAM disk. However, this reference is poorly translated from Japanese. In that regard, what Obata refers to as his "ROM" disk area (the embossed zone 114A) is not what Applicants are claiming in claim 1: that the bumps represent pre-recorded information. Instead, the bumps in Obata are simply there to provide a track for the recording (using the phase change layer) of an identifier for the disk. In particular, note the following from Col. 7, line 66 through Col. 8, line 15:

> Thereby, according to the present invention, the transition area 113 and the embossed area 114A being the first annular zone of the disk of the present invention are defined to be used as a zone corresponding to a third annular zone of the disk, for recording the disk cartridge identification information.
>
> The disk cartridge identification information is recorded by forming a

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> plurality of rectangular patterns each having its length in a radial direction of the optical disk and its width in perimeter directions thereof, and spaced apart from each other in the perimeter directions. More specifically, the disk cartridge identification information is expressed by a combination of compression and rarefaction of a gap between the plurality of rectangular patterns in the perimeter directions, or by a combination of different sizes of the plurality of rectangular patterns in the directions of its width. The above-mentioned rectangular pattern can be formed, for example, by the following process.

Having thus described the purpose of the embossed area as a zone for recording disk identification information, Obata goes on to note how he records this information in Col. 8, lines 16-21:

> Because the phase change recording film is formed also on the transition area 113 and the portion of the embossed zone 114A, the rectangular pattern is formed by a phase change in the phase change recording film by irradiation of a laser beam onto the phase change recording film. Namely, it is recording by a laser marking process.

Thus, Obata cannot possibly be using the embossed area as claimed by the Applicants in claim 1. In particular, note that Obata is just making a RAM disk that is written to using the phase change layer, a conventional and well understood process. In sharp contrast, the Applicants are claiming a very different disk in which content is written to the disk using the stamper (as is done with the familiar DVDs and audio CDs). However, unlike prior art mastered optical disks, the disk of claim 1 also has a RAM area formed from the same continuous phase change layer that forms the ROM area. Thus, claim 1 is patentable over Obata. The Ohkawa reference (USP 5,796,708) does nothing to cure the infirmities of the Obata reference. Thus, claim 1 is patentable over the combination of the Obata and Ohkawa references.

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The Takemura reference (USP 5,923,640) is a conventional hybrid ROM/RAM disk. Applicants readily admit that such hybrid disks are in the prior art. However, as

taught by Takemura they were cumbersome affairs, requiring the separate formation of the ROM and RAM areas in that the phase change layer used to form the RAM area was not used to form the ROM area. This may be plainly seen in Takemura's Figure 9, in which the phase-change layer (element 16) that coats the RAM area (element 2) is not covering the ROM area (element 3). Thus, Takemura in no way teaches or suggests the inventive combination of claim 1 wherein the phase change layer is used to coat both the ROM and RAM portions. The Sonnenschein reference (USP 4975398) adds nothing further as it does not disclose or suggest a hybrid disk. The same is true for the Phillips, Muller, Pan, Kumagai, Nakamura, and Nakashima references. Accordingly, claim 1 and its dependent claims 4, 7, 10, 11, 12, and 15 are patentable over the cited prior art.

CONCLUSION

For the foregoing reasons, Applicant believes pending Claims 1, 4, 7, 10, 11, 12, and 15 are allowable, and a notice of allowance is respectfully requested. If the Examiner has any questions regarding the application, the Examiner is invited to call the undersigned Attorney at (949) 752-7040.

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Jonathan Hallman — November 7, 2005 (Date of Signature)

Respectfully submitted,

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